The homework consist of two equally important tasks:

1. Design and implement a software architecture for a general 3D file converter, that allows you to read, convert, and write 3D mesh file formats. The architecture should make it possible to easily extend the implementation with new file formats.

2. Create a concrete implementation for OBJ->STL conversion (only one direction! From OBJ to binary STL). The OBJ file support should be limited to *v, vt, vn* and *f* elements. STL export should be binary STL, not the text version. Note that OBJ supports non triangular faces. You can assume that these are always convex planar faces.

The followings are not must haves, but lots of fun to implement (bonus points):
- Allow the user to set a transformation (any combination of rotation, scale, translation) in the converter.
- Calculate the surface area of the model
- Calculate the volume of the model. You can assume that the model is watertight.
- Implement an algorithm that will decide from a 3d point if it is inside or outside the model. You can assume that the model is watertight.

For the OBJ format use http://paulbourke.net/dataformats/obj/ as a reference, and for STL use https://en.wikipedia.org/wiki/STL_(file_format) since neither has a standard reference so we have to choose one to one to avoid inconsistencies among the solutions.

The high level implementations of the main tasks are required to be 3rd-party dependency free, i.e. don't use 3rd-party libraries for OBJ parsing, STL writing, deciding about point containment, etc. However feel free to use existing solutions for lower level parts, e.g. a vector math library instead of implementing your own (a high quality one with SIMD optimizations and so on would be a separate task on it's own).

The code that you submit must be **production ready**, assuming you were to release this functionality to millions of users. We are expecting high quality software design, extendable architecture, great performance and overall a demonstration of world-class engineering. We have great ambitions and that requires very high quality bar.